

III. Amendments to the Drawings

The attached Replacement Sheet of Drawings includes changes to Fig. 6. Also attached is an Annotated Sheet showing changes.

In Fig. 6, the figure is shown inverted for clarity.

Attachment: Replacement Sheet

Annotated Sheet Showing Changes

IV. Remarks

Reconsideration and allowance of the subject application are respectfully requested.

Claims 1-18 and 20-21 are pending in the application. Claims 1 and 20 are independent.

Applicants have added new dependent Claim 21 to afford themselves a scope of protection commensurate with the disclosure. The new claim is fully supported in the specification and Drawings, and is believed to be allowable for the reasons to be developed below.

With respect to paragraph 2 of the office action, claim 1 has been amended to provide antecedent basis for the term "spectrum disperser" in line 7.

With respect to paragraph 3 of the office action, claim 19 has been cancelled and claim 20 has been amended to explicitly recite features in amended claim 1 so as to avoid duplication. No new matter has been added.

With respect to paragraph 4 of the office action, the Applicant confirms that the proper term is "plane grating", as would be understood by persons skilled in the art as being directed to a grating that is substantially "flat" (see e.g. paragraphs [0013] and [0027] of the application as filed).

With respect to paragraph 5 of the office action, Figure 6 has been replaced with a drawing showing the image

of original Figure 6 in inverted form for clarity. A corresponding amendment has been made to paragraph [0079] of the application as filed. It will be understood that the image in the replacement figure is shown in inverted form to allow details of the image to be more clearly visible for the purposes of publication, and no new matter has been added.

With respect to paragraph 7 of the office action, claim 1 has been amended to correct the antecedent basis for the term "lens" in line 15.

With respect to paragraph 8 of the office action, claim 5 has been amended to recite exemplary performance enhancing elements as described at paragraph [0054] of the application as filed. No new matter has been added.

In the office action, claims 1, 2, 4, 10-11 and 18-20 have been rejected as being obvious in view of Martens (U.S. Patent No. 5,297,555) and Manabe (U.S. Patent No. 4,950,077). Claims 3, 6-9, and 12-17 were held to contain allowable subject matter.

Claim 1 has been amended to clarify that the radiation collecting and delivery elements are adapted to collect polychromatic radiation from a plurality of objects. That light is then collected by a composite achromatic collimating lens which transforms beams of polychromatic radiation ranging between wavelengths λ_1 and λ_2 into collimated polychromatic beams. Support for these amendments

can be found throughout the specification (see e.g. paragraphs [0067] to [0069] of the application as filed).

Claim 1 has also been amended to clarify that the transmission diffraction grating transforms each collimated polychromatic beam produced by the composite achromatic collimating lens into a fan of diffracted collimated monochromatic beams so that each diffracted collimated monochromatic beam has a wavelength that is within a working spectral range ranging between wavelengths λ_1 and λ_2 . Support for these amendments can be found throughout the specification (see e.g. paragraphs [0069] and [0071] of the application as filed).

A number of terms in claims 2, 3, 4, 9 and 18 have been amended for clarity and to be consistent with the amendments made to claim 1. No new matter has been added.

Claim 10 has been amended to recite features of a focusing objective in accordance with a specific embodiment, as described at paragraph [0077] of the application as filed.

New claim 21 has been added, directed to an embodiment described at paragraph [0069] of the application as filed. No new matter has been added.

All of the features of claim 1, as amended, are neither taught nor suggested in the prior art cited by the Examiner.

Martens teaches a spectrometer built on one axis, where all orders of diffraction are measured. This is

strongly emphasized in Figure 1 and the corresponding description, where the detection plane 12 detects several diffraction orders 26. The Applicant submits that this is a very ineffective utilization of detectors in terms of both spectral and spatial resolution.

Martens also does not utilize a composite lens, as claimed in claim 1. Furthermore, in contrast to Martens, the Applicant's composite lens of claim 1, as amended, detects a range of wavelengths between λ_1 and λ_2 , such that a fan of diffracted collimated monochromatic beams is produced by the transmission diffraction grating from the polychromatic radiation collected by the composite lens, wherein each diffracted collimated monochromatic beam has a wavelength that is within the working spectral range as determined by the shortest and longest wavelengths λ_1 and λ_2 . The fan of beams of monochromatic wavelengths is then focused onto the photodetector plane.

Manabe teaches a multi-channel apparatus that works differently than the Applicant's analyzer. The apparatus in Manabe first uses a diffraction grating to split polychromatic light into monochromatic light, and then illuminates a plurality of objects. However, in the Applicant's analyzer as claimed in amended claim 1, polychromatic radiation is collected from a plurality of objects. Subsequently, that light is diffracted by a grating

to produce multiple monochromatic signals which are then registered on a photodetector.

Accordingly, the combination of Manabe and Martens is not possible as Manabe splits the light into a plurality of monochromatic beams to illuminate a plurality of objects of interest, while Martens analyzes a single polychromatic beam collected from an object.

For the foregoing reasons, it is respectfully submitted that claim 1 is novel and not obvious in view of Manabe and Martens, taken alone or in combination. It is respectfully submitted that claims 2-18, which are dependent on claim 1, and claim 20 are also patentable for the same reasons.

For completeness, the Applicant notes that amended claim 10 and claim 11 are directed to embodiments where the composite focusing objective comprises three lenses: 2 thin positive lenses and one thick negative between them. Contrary to the Examiner's comments in paragraph 14 of the office action, it is respectfully submitted that the prior art neither teaches nor suggests this particular configuration. As noted in paragraph [0078] of the application as filed, this particular inventive arrangement allows equal length images of all wavelengths of the working band covering a band not much larger than one octave to be produced. In contrast, prior art systems are often required

to employ algorithms to post-process images which create what is known in the field of spectroscopy as a "smile" effect. Such algorithms are not required when the Applicant's claimed composite focusing objectives are used.

Accordingly, the salient claimed features of the present invention are nowhere disclosed by the cited art, whether that art is taken individually or in combination.

In view of the above, it is believed that this application is now in condition for allowance, and a Notice thereof is respectfully requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 625-3507. All correspondence should continue to be directed to our address given below.

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APPENDIX

REPLACEMENT SHEET

ANNOTATED SHEET SHOWING CHANGES